STUDENT TECHNOLOGY FEE PROGRAM
2015 TECH INITIATIVES SUMMARY SHEET

Student Applicants:
Complete “Project Title,” “Applicants” information, and “Submission Date” only (top section).

Project Title: Strength Measurement in the Health Sciences

Department/Organization: Physical Education, Health and Recreation

Applicants (first applicant is considered primary contact):

Name: David N. Suprak  Mail Stop: 9067  Email: david.suprak@wwu.edu  Phone: 2896
Name: Jun G. San Juan  Mail Stop: 9067  Email: jun.sanjuan@wwu.edu  Phone: 2336
Name: Lorrie Brilla  Mail Stop: 9067  Email: lorrie.brilla@wwu.edu  Phone: 3056

STF Grant Request (from page 1 of 2015 proposal form: line 6) ................. $ 45,000
Authorization for contribution resources (if applicable): $6,778.30

Submission Date: April 2, 2015

______________________________________________________________

SUBMITTAL APPROVALS

AS President  Required for all proposals submitted by Associated Students (AS). Signifies that all student proposals have been prioritized by AS.

Deanna Judson  1/2/15  Acting Chair on 4/12

Department Chair  Required for all proposals from a specific department. Signifies that the department can support the project as submitted.

[Signature]  7/6/15

College Dean or Unit Head  Signifies that the College or organizational unit can support the program as described.

[Signature]

**Project’s Strategic Priority by College: / **
For proposals originating from a college, the dean must review, sign, and strategically prioritize that batch of proposals.

Space Administration  Required for all proposals that require additional facilities or changes to existing facilities. Signifies that all space-related issues have been addressed.

[Signature]

Vice Provost for Information Technology/CIO  Required for all proposals related to all-university services and all proposals not related to a specific discipline. Signifies that the technology support organizations and technical infrastructure can support the submitted project.

[Signature]

2015 STF Project Summary Sheet
Student Technology Fee – AY 2015
Tech Initiatives Proposal Form
DUE April 2, 2015

Project Title: Strength Measurement in the Health Sciences

Department/Organization: PEHR

Project Applicant(s):
Principal Contact
Name David N. Suprak MS 9067 Email: david.suprak@wwu.edu
Phone 650-2896

Others
Name Jun G. San Juan MS 9067 Email: jun.sanjuan@wwu.edu
Phone 650-2336

Name Lorrie Brilla MS 9067 Email: lorrie.brilla@wwu.edu
Phone 650-3056

Amount Requested for Project
Proposed Budget:
1. Equipment total $ 45,000
2. Plus site preparation (not STF funded) + $ 0
3. Total Project Cost (spreadsheet total from part IV of this form, Total Project Budget) = $ 51,778.30
4. Less organization’s contribution $ 6,778.30
5. Less site preparation $ 0
6. STF Grant Request = $ 45,000

IMPORTANT NOTE
1. THE STF Committee will accept only complete proposals by the announced deadline. Every section (I–IX) and all items of this proposal format must be addressed.

I. Executive Summary (800 words max)

Provide a summary of the project and the benefits to be derived. Explain what the students would gain from the project, and how the acquisition would meet the Student Technology Fee mission.

STF Mission:
The Student Technology Fee provides Western students with adequate and innovative technology experiences by:

- Broadening/enhancing the quality of the academic experience
- Providing additional student access to technology
- Increasing integration of technology into the curriculum

The purpose of this project is to fund the purchase a new state-of-the-art system to collect muscle torque output data during various movements of interest to undergraduate
students in our department. Within the Kinesiology program, which is the largest on campus, we offer several courses that provide students with the opportunity to examine muscle function across various joints in movement-specific contexts. This experience is invaluable to undergraduate students, as it helps them develop a deeper understanding and appreciation of the roles of muscles and joints in providing movement and/or joint stability in activities of daily living, as well as athletic tasks. In addition, this will afford students exposure to practical experience relating to a commonly used testing apparatus and paradigm in rehabilitation and research in the field. This experience is also advantageous for our students, in that it affords them practical opportunities to which students at other institutions often do not have access. For this purpose in the recent past, we have used a system that has proven to be quite cumbersome in its implementation, with limited utility due to the time required for set-up during labs and technical problems in its operation. Presently, this MS-DOS-based system, which we have been using for approximately 30 years, has limited functionality, with no opportunities for software updates or upgrades and no technical support available, given that the company no longer manufactures or supports this model. We would like to request approximately $45,000 to fund the purchase of a new Biodex System 4 Pro Orthopedic Testing and Rehabilitation System. With this unit, we would be able to quickly and efficiently instrument students to collect data on torque generation of any major joint to illustrate critical concepts in both biomechanics and functional anatomy, as well as exercise physiology. This unit would be used to allow all students in various courses within the Kinesiology program to gain hands-on experience in collecting and analyzing data using this unit and the accompanying software.

The purchase of this unit would have wide-reaching benefits to undergraduate students in our department. It would be used by students in KIN 311 (Biomechanics), KIN 312 (Functional Anatomy), KIN 413 (Physiology of Exercise), KIN 415 (Fitness Appraisal and Exercise Prescriptions), as well as other courses. In addition to undergraduate student use of the this technology, graduate students will use the unit on several occasions for demonstration of techniques, as well as in lab sessions. They also often include measurements of muscle strength and joint torque in master’s thesis projects. Since 2008, the number of students in the Kinesiology and Physical Education Program has grown from 308 to 548. Due to the number of students that are required to take these courses, plus students that are involved with undergraduate research projects, this equipment will be used by approximately 400 students each academic year. With the growing number of majors in the program, the number of students who will have access to this equipment is expected to grow, as well. In addition to access that students will receive in class, they will also be able to use the equipment for term project data collection and independent use to complete laboratory assignments.

We have thoroughly researched the equipment that would best suit the needs of the undergraduate students in our courses. In addition to the unit we desire to purchase, we also investigated similar units by several other companies, including Humac, Cybex, and Kin-Com. All of these other units had undesirable limitations, either relating to limited software functionality and support, limited flexibility with joint movements, arduous and time-intensive set-up, and/or limited utility with data analysis. With the educational discounts that we will receive, we have negotiated the best deal on the equipment that we can get. Course fees from KIN 311 and KIN 312 can be used to fund upgrades and maintenance of the equipment. Currently, each course enrolls 360 students per academic year. At a course fee of $20 for each course, this totals $7,200 annually. Given that these funds are also used to cover upgrades and maintenance for other equipment, as well as supplies, used in the courses, we allocate 30% of these course fees for the needs associated with the Biodex system. This amounts to $2,160 that can be applied toward upgrades and maintenance of this system each year.

If funded, this purchase will allow more undergraduate students to be integrally involved in lab sessions to collect and analyze joint torque and muscle strength during movement.
It will also enhance the educational experience of undergraduate students by allowing
greater access to the data collection process for each undergraduate student in the lab
setting.

II. Relationship to STF Objectives / Impact on Current Academic Programs

The STF Committee will use as its primary assessment criteria the three objectives—quality, access,
and integration—defined in the STF mission (above). Given this criteria, describe your proposed project
in detail.

1. Tell us—focusing on what the students will gain from the project—how the project would provide
positive benefits to specific courses or instructional programs. Specifically, answer at least one of a,
b, and c below:

a. How would this project provide additional student access to technological resources?

Given the advanced age of the current system (> 30 years) in the Biomechanics
Laboratory, and the lack of available updates for the integrated software, the
usefulness of the equipment is limited. This limitation is manifested in unwieldy
operation, and software glitches that slow down the instructional process and limit
the number of students that can have hands-on practical access to the equipment.
The state-of-the-art system that we are proposing purchasing involves a much more
streamlined process for instrumenting participants, more quickly positioning them on
the apparatus for more efficient use of class time and more consistent data collection.
In addition, the included up-to-date software, along with annual software updates, will
ensure that collection of data during class time is completed more quickly and
reliably. These characteristics of the new system will result in each student having
both higher quality and more extensive access to the experience of collecting and
analyzing this type of strength and functional assessment data in the appropriate
laboratory courses.

b. How would this project broaden or enhance the quality of the student’s academic experience
through the proposed technology?

In the Kinesiology program, we take great pride in the quality of education provided to
our students in their classroom and laboratory experiences. We try to infuse our
classroom instruction with the latest in scholarly work in the field, including our own.
In addition, we work diligently to provide our students with practical experience
collecting and analyzing data using state-of-the-art laboratory equipment available to
professionals in the field. We feel that we have been successful in the past in
providing these top-notch experiences to our students. One area in which we have
been limited recently in this vain has been in our collection of strength data in lab.
This is because our current system, the Biodex System II, is quite out of date. It was
purchased over 30 years ago, and has served us well over the years, but the
accompanying software is no longer supported, and replacement parts are
unavailable for maintenance. Therefore, its usefulness for laboratory teaching
purposes is limited. Given that this system is in wide use in the field, in both clinical
and performance-based settings, our students’ exposure to and proficiency with it is
important in making them more competitive as they enter the work force or seek
further education in related graduate programs. Therefore, the funds from this
proposal would enable us to further enhance the quality and relevance of our
students’ education by providing them with important hands-on experience with a
commonly used system in their future careers.

c. How would this project increase integration of technology into coursework?
The faculty of the Kinesiology program work hard to help our students understand the utility of, and to gain proficiency with, the use of various data collection and functional assessment systems relevant to the Kinesiology field. Our laboratory activities are designed for the purpose of maximizing student exposure to these systems so that they feel comfortable and confident using them when they enter the work force or as they pursue graduate work in the area. For many years, our ability to integrate experience with functional assessment of strength in the most relevant manner for our students has been limited due to our aging and failing Biodex System II. The new system that would be purchased with the proposal funds would empower the Kinesiology faculty to increase the use of this equipment in the courses currently using it, as well as more easily incorporating it into the teaching strategies for other laboratory courses in the program and department. There are a multitude of applications for which the assessment of muscle strength is useful, and for which it has not been feasible in recent years. However, this new system would allow us to incorporate the collection of this functional strength data into so many more applications in our courses to provide students with a much broader and deeper understanding of its utility and importance.

2. Would other departments be involved with this project?
   No ☒ Yes ☐ If yes, describe.

3. Has any part of this project previously been funded by the Student Technology Fee?
   No ☒ Yes ☐ If yes, describe.

4. Is the proposed project a pilot project?
   No ☒ Yes ☐

III. Utilization

List the anticipated number of times and duration per each use—per quarter or per academic year—that students would use the proposed technology. The committee is looking for total student hours and total number of unique students who would use the technology in that time period. Explain how you arrived at this utilization.

This total student hours calculation is based on enrollment during the 2014-2015 academic year. Please see attached Table 1 for more details. The calculation is based on number of groups that will be using the Biodex during the specific lab assignment. In each section of the lab, there are 7 groups with 2-3 students per group. Each group will have approximately 7 minutes to collect data needed for the lab report. For KIN 311 - Biomechanics, the total student hours per AY will be 8 hours and 10 minutes. For KIN 312 - Functional Anatomy, the total student hours per AY will be 6 hours and 32 minutes. Additionally, students who are going to be utilizing the Biodex for group project (KIN 311), independent research both graduate and undergraduate, averages around 10 students per term or equal to 30 students per term. On average each student will be using the Biodex for an hour worth of data collection which amounts to 30 hours per academic year. The approximate total student hour use for the Biodex each academic year is 44 hours and 42 mintues.
IV. Total Project Budget

This section details the estimated total cost of the project. Include costs that would be covered—by your department or another source—for ongoing costs such as personnel or operating expenses.

1. For assistance in preparing your budget, please consult with relevant campus support departments (ATUS, Purchasing, Space Administration, etc.).

2. For more information about these contacts and helpful tools/links: from the STF website home page (http://www.wwu.edu/stf), choose "STF Tech Initiatives" on sidebar, then section "II. Tech Initiatives Forms and Instructions."

Attach an Excel spreadsheet if you have additional details.

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<th>Item</th>
<th>Quantity</th>
<th>Item Cost</th>
<th>Total</th>
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<td><strong>$51,778.30</strong></td>
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<td>should match the projected budget figure on page 1 of this proposal. (See box on page 1, line 3.)</td>
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</table>

Important Notes from the STF Committee:

- We recognize your proposed budget as an estimate. Final funding for successful projects will be established after thorough technical review; some costs may need adjusting due to price changes.

- We recommend that you include a 3 percent cushion to allow for price increases.

- We may impose special conditions on a proposal before approval. See STF Proposal Guidelines.

- Funding is not provided directly to departments for purchases. All purchasing is done via the Office of the VPIT/CIO and savings are retained in the STF fund.

3. What funding or contributions are available from your department or other sources?

   **Note:** "Contribution" is defined as a monetary contribution. A vendor discount, for example, is not considered a contribution.
The remaining $6,778.30 from the total budget will be paid by the department. In addition, student lab fees for both KIN 311 and KIN 312 will be utilized for software upgrades and yearly maintenance of the equipment which is around $2,160 per year.

4. Could this project be divided into discrete elements that could be funded separately?

   **Note:** A “no” response to this question creates an “all or nothing” proposal. That is, if the STF Committee decides against funding your entire proposal, it will not consider any elements for partial funding. If elements could be funded separately, the applicant is responsible for prioritizing them before submitting the proposal.

   **No ☒ Yes ☐** If yes, summarize and prioritize project elements with cost estimate for each.

5. Are course or lab fees charged for any of the courses that will use this equipment?

   **No ☐ Yes ☒** If yes, describe. **Please note:** The total funding requested from the Student Technology Fee must reflect the amount collected from course fees for equipment replacement and/or equipment acquisition.

   Currently, both KIN 311 and KIN 312 enrolls 360 students per academic year. At a course fee of $20 for each course, this totals $7,200 annually. Given that these funds are also used to cover upgrades and maintenance for other equipment, as well as supplies, used in the courses, we allocate 20% of these course fees for equipment replacement and/or equipment acquisition. This amounts to $1,440 each year.

**V. Impact on Existing Resources**

Your proposal must address the project’s potential impact on existing resources. Give special attention to the impact on data transmission networks (e.g., sources accessed, networking equipment, etc.), and personnel (e.g., staffing, administrative support, faculty support, etc.).

1. Describe how existing equipment is used. Contrast this to projected use if your project were funded.

   The existing Biodex System II isokinetic dynamometer is being utilized in KIN 312-Functional Anatomy to demonstrate the theory behind the relationship of force and muscle length and force and contraction velocity of the muscle. Currently, we are limited in the use of the equipment because of the dated software (MS-DOS based), limited rehabilitation protocol, inability to calibrate the machine and long participant set-up. Because of these limitations, we can not maximize the use of the Biodex dynamometer for lab application.

   If this project is funded, additional classes will be utilizing the machine. KIN 311 - Biomechanics will add a Joint Torque lab to help students better understand the connection of the human joint motion to force production. In addition, another class that will benefit from the Biodex dynamometer is KIN 413-Physiology of Exercise. Students will be able to quantify fatigue and work during strength training exercises. Additionally, both undergraduate and graduate students will be able to use the Biodex for class project, thesis, and independent research study.

2. Is similar equipment or technology available elsewhere on campus—such as the Student Technology Center, Classroom Services, Video Services, Western Libraries, a college lab?

   **No ☒ Yes ☐** If yes, describe why the existing equipment does not meet the needs outlined in this proposal.
3. If this project involves the replacement of equipment, including computers:

a. Describe the "before and after" configuration changes. (A spreadsheet reflecting these changes may be attached.) Or, write "N/A."

Please see attached figures. The Biodex System 2 we have still runs using a MS-DOS based software. The rehab protocols in the current software version is out-dated and the software can not be upgraged.

b. Describe the costs and benefits of replacing vs. upgrading. Or, write "N/A."

The current Biodex System 2 in the lab is discontinued and not supported by the manufacturer for any mechanical work (i.e. calibration) and software upgrade.

4. Would this equipment be available to students outside of your department?

No ☒ Yes ☐ If the proposed technology would be used by students outside of your department, describe how they would gain access, how equipment availability would be publicized, the hours/week when equipment would be available, and any costs that would apply.

5. Does this project involve the check-out of equipment to students?

No ☐ Yes ☒ If yes, discuss whether or not the Student Technology Center/ATUS Loan Pool could be assigned this task.

6. Does the department have adequate operating funds to provide ongoing maintenance and support?

No ☐ Yes ☒ If yes, describe.

Student lab fees for both KIN 311 and KIN 312 will be utilized for software upgrades and yearly maintenance of the equipment which is around $2,160 per year.

7. Does the department have adequate personnel funds to provide ongoing staff support for the project?

No ☐ Yes ☒ If yes, describe.

Graduate teaching assistants are allocated for both KIN 311 and 312 every year. The funding is a recurring budget provided by the graduate school and the College of Humanities and Social Sciences.

VI. Space and Site Information

This section addresses any space alteration or site preparation necessary for the proposed project. Site alterations include painting, holes in walls, security systems, carpeting, construction, lighting changes, or conversion of a lab or office.

Special Note: If this project would require any site preparation, or if this project would use any space not currently under your department's control:

a. You must submit a draft proposal to Space Administration by March 13, 2015.
b. Space Administration and Facilities Management will then conduct a site survey and respond to you by *March 20, 2015* about project feasibility, cost, and schedule.

c. You must include the site survey response with your final proposal.

1. Location for installation of equipment or technology:
   
   Carver 146

2. Would site modification be required?
   
   **No ✗ Yes ☑** If yes, describe the modifications (e.g., electrical, air, painting, lighting, security, network access, etc.).

3. Would this project use space not currently assigned to your department or area?
   
   **No ✗ Yes ☑** If yes, describe.

### VII. Project Schedule

Describe your overall implementation schedule. (Remember that project awards are announced during spring quarter, and that projects are to be substantially completed by the end of the calendar year.) If any site preparation is involved (see section VI above), align your project schedule with the schedule provided by Space Administration and Facilities Management.

*If funded, the equipment will be ordered by the end of the Spring Quarter 2015. The equipment will be available to be utilized by students for lab use beginning Fall 2015.*

### VIII. Constraints

List or describe any external or internal factors/constraints that could affect your project schedule, project objectives, or the project budget (e.g., if external approval is required for curricular changes, or if funding must be received by a certain date).

None

### IX. Submitting the Proposal

1. Make sure your proposal does not exceed 12 pages (not including Tech Initiatives Summary Sheet).

2. Complete a [2015 Tech Initiatives Summary Sheet](#) for the front of the proposal.

3. Submit the proposal and summary sheet electronically for prioritizing (PDF preferred, or Word document):
   
   a. *Faculty and staff:* Submit by internal due date, which must be before proposal due date of April 2.
   
   b. *Students:* Submit by March 31 to AS VP for Academic Affairs at ASVPforAcademicAffairs@wwu.edu.

4. Submit prioritized proposals:
a. *Organization reps and AS VP for Academic Affairs:* Submit to Student Technology Fee (STF) Committee by 12:00 noon on April 2.

b. For each proposal, email one electronic version (PDF preferred, or Word document) of both the proposal and the summary sheet to diane.bateman@wwu.edu (the STF Committee secretary).

**Note:** Paper copies of proposals are no longer required; please do not send.
Table 1. Utilization of the Block Exoskeleton Dynamometer based on AV 2014-2015 enrollment

| 2,682 | | | |
|-------|---|---|---|---|
| 392   | 490 | | | |
| 93 00 | | | | |
| 00 06 | 96 | 7 | 14 | 196 | 7 | 28 |
| 00 66 | 196 | 7 | 28 | 88 | 7 | 14 |
| 00 60 | 96 | 7 | 28 | 96 | 7 | 28 |
| 00 66 | 196 | 7 | 28 | 88 | 7 | 14 |

<table>
<thead>
<tr>
<th>Independent Research</th>
<th>KIN 312 - Functional Anatomy</th>
<th>KIN 311 - Biomechanics</th>
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**Total Use (Min)**

<table>
<thead>
<tr>
<th>Spring</th>
<th>Winter</th>
<th>Fall</th>
<th>Term</th>
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<tbody>
<tr>
<td>196</td>
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**Total Use (Min)**

| 196 | 88 | 196 | 96 |

**Total Use (Min)**

| 196 | 88 | 196 | 96 |

**Total Use (Min)**

| 196 | 88 | 196 | 96 |

**Total Use (Min)**

| 196 | 88 | 196 | 96 |

**Total Use (Min)**

| 196 | 88 | 196 | 96 |

**Total Use (Min)**

| 196 | 88 | 196 | 96 |

**Total Use (Min)**

| 196 | 88 | 196 | 96 |
Figure 1. Current System - Biodex System 2

Figure 2. The equipment we are proposing to purchase Biodex System 4